INCH-POUND
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9 September 2005

DETAIL SPECIFICATION

HEADSET, ELECTRICAL H-154A/AIC

Reactivated after 20 April 2006 and may be used for new and existing designs and acquisitions.

This specification is approved for use
by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers one type of headset, designated Electrical Headset H-154A/AIC.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3, 4, or 5 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in sections 3, 4, or 5 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-PRF-25670/2	Earphone Element, High- and Low-Altitude, H-143/AIC, and Low-Altitude, Water-Immersible, H-143A/AIC
MIL-DTL-22442	Cable Assemblies, Aircraft Audio, General Specification For
MIL-DTL-22442/33	Cable Assemblies, Aircraft Audio, CX-4707C/AIC
MIL-DTL-22442/37	Cable Assembly, Aircraft Audio, CX-4708A/AIC
MIL-DTL-9177/2	Connector, Audio, Airborne, Plug, Miniature, 4 Contact

Beneficial comments, recommendations, additions, deletions, clarifications, etc., and any data that may improve this document should be sent to: DLA-CC, DLA Land and Maritime, ATTN: VAI, P.O. Box 3990, Columbus, Ohio 43218-3990 or emailed to sound@dscc.dla.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at https://assist.dla.mil.

AMSC N/A FSC 5965

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-202	Test Method Standard, Electronic and Electrical Component Parts
MIL-STD-810	Environmental Engineering Considerations and Laboratory Tests
MIL-STD-1285	Marking of Electrical and Electronic Parts

(Copies of these documents are available online at http://quicksearch.dla.mil or from the Document Automation and Production Service (DAPS) Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.2.2 Other Government documents, drawings and publications. The following other Government documents, drawings, and publications form a part of this specification to the extent specified herein.

DRAWINGS

Air Force (CAGE 97151)

7136032	Headset Kit, MK-634/AIC
7136036	Headset, Electrical H-154A/AIC – Assembly of
7136037	Shell, Earphone – Headset
7136038	Cushion, Earphone – Headset
7136039	Pad – Earphone

(Copies of these documents required by contractors in connection with specific acquisition functions may be obtained from the procuring activity at DSCC.cddwgs@dla.mil, or as directed by the contracting officer.)

(Copies of specifications, standards, drawings, handbooks, and publications required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

2.3 Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

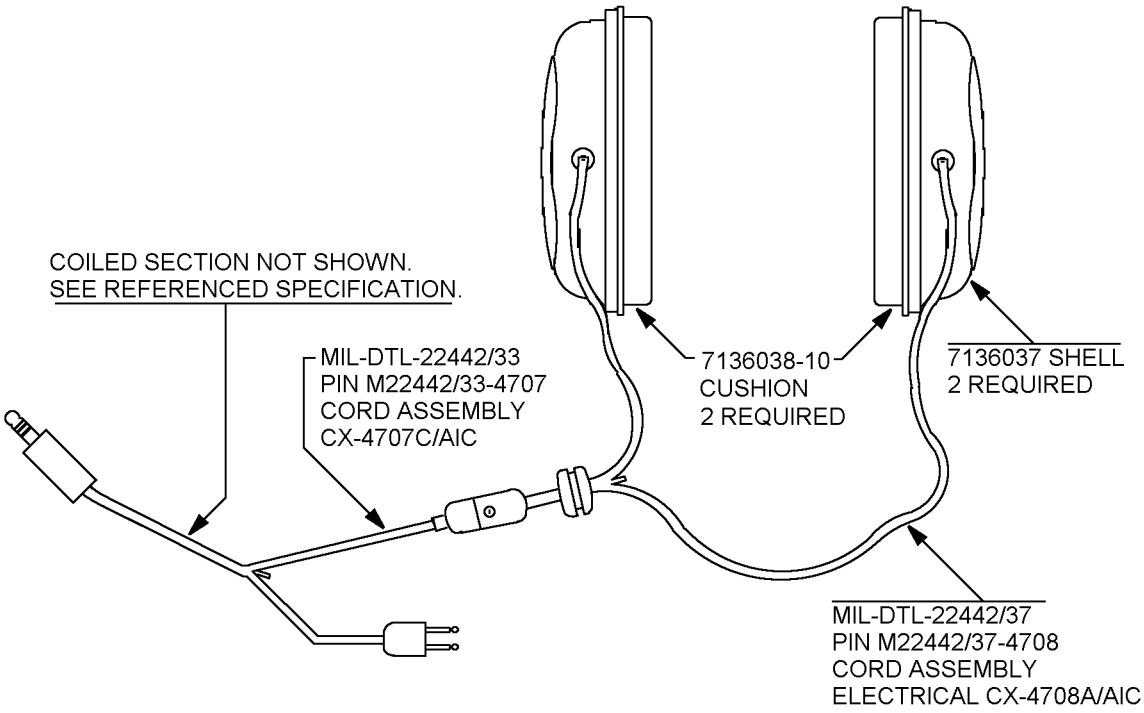

FIGURE 1. H-154A/AIC.

3. REQUIREMENTS

3.1 First article. When specified (see 6.2), a sample shall be subjected to first article inspection in accordance with 4.2.

3.2 Materials (see 6.4). Materials shall be as specified herein. However, when a definite material is not specified, a material shall be used, which will enable the product to meet the performance requirements of this specification. Acceptance or approval of any constituent material shall not be construed as a guaranty of the acceptance of the finished product.

3.2.1 Pure tin. The use of pure tin, as an underplate or final finish, is prohibited both internally and externally. Tin content of headset components and solder shall not exceed 97 percent, by mass. Tin shall be alloyed with a minimum of 3 percent lead, by mass (see 6.3).

3.2.2 Recycled, recovered, environmentally preferable, or biobased materials. Recycled, recovered, environmentally preferable, or biobased materials should be used to the maximum extent possible, provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.3 Construction.

3.3.1 General design. The headset shall be designed to be inherently stable in mechanical construction (see figure 1), electrical characteristics, and acoustical performance and shall be suitable for extended military aircraft use. The detailed mechanical and electrical design of this headset shall be accomplished by the contractor subject to the requirements of drawing 7136036 and this specification; these requirements being detailed herein only to the extent deemed necessary to obtain the desired mechanical and electrical characteristics and performance.

3.3.2 Complete assembly. Headset, Electrical H-154A/AIC shall consist of the following components, assembled in accordance with Drawing 7136036:

Quantity	Item
2 ea.	Earphone, H-143/AIC in accordance with MIL-PRF-25670/2.
2 ea.	Shell, Earphone, in accordance with Drawing 7136037.
1 ea.	Cord Assembly, Electrical, Branched CX-4707C/AIC in accordance with MIL-DTL-22442/33, P/N: M22442/33-4707.
1 ea.	Cord Assembly, Electrical, Branched CX-4708A/AIC in accordance with MIL-DTL-22442/37, P/N: M22442/37-4708
1 ea.	Installation Kit, Electronic Equipment MK-634/AIC in accordance with Drawing 7136032
2 ea.	Cushion, Earphone Shell, 7136038-10 in accordance with Drawing 7136038
2 ea.	Pad, Earphone, in accordance with Drawing 7136039

3.4 Cord assemblies. Cord assemblies are in accordance with MIL-DTL-22442 specification sheets referenced.

3.5 Performance characteristics.

3.5.1 Electrical.

3.5.1.1 Circuitry. The two earphones shall be connected in parallel, see figure 2 for schematic diagram.

3.5.1.2 DC resistance of the headset circuit. The dc resistance of the headset circuit shall be between 8.5 and 11.5 ohms inclusive (see 4.5.2).

3.5.1.3 DC resistance of microphone circuit. The dc resistance of the microphone circuit shall not exceed the total allowable resistance of the conductors in the circuit (microphone not included in assembly) (see 4.5.3).

3.5.2 Acoustical.

3.5.2.1 Acoustic distortion. There shall be no buzzes, rattles, or voice distortion when the headset is operated as specified herein (see 4.5.4).

3.5.2.2 Functional operation. The headset shall perform satisfactorily when used with Intercommunication Sets AN/AIC-10( ) or AN/AIC-18 and when subjected to the functional operation test specified herein (see 4.5.5).

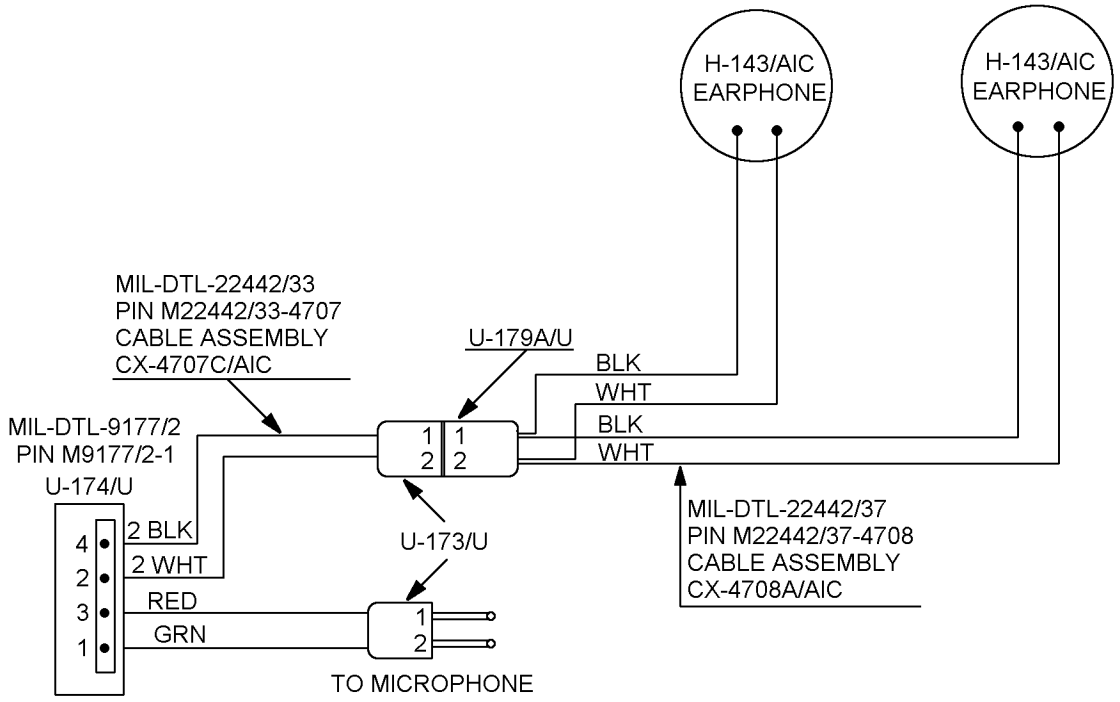

FIGURE 2. H-154A/AIC wiring diagram.

3.6 Environmental tests.

3.6.1 Temperature. When tested there shall be no parts cracked or deformed due to extreme temperature and the DC resistance of the headset circuit requirements of 3.5.1.2 shall be met (see 4.6.1).

3.6.2 Vibration. When tested, there shall be no loose parts or evidence of mechanical failure and the dc resistance of the headset circuit requirements of 3.5.1.2 shall be met (see 4.6.2).

3.6.3 Shock. When tested, there shall be no failure due to broken or deformed parts and the dc resistance of the headset circuit requirements of 3.5.1.2 shall be met (see 4.6.3).

3.6.4 Humidity. When tested, there shall be no failure due to moisture or corrosion and the dc resistance of the headset circuit requirements of 3.5.1.2 shall be met (see 4.6.4).

3.6.5 Salt fog. When tested, there shall be no failure due to corrosion, and the dc resistance of the headset circuit requirements of 3.5.1.2 shall be met (see 4.6.5).

3.7 Marking. Marking shall be in accordance with MIL-STD-1285. Location shall be as specified (see 3.1) and shall consist of the following:

a. NSN.

b. PIN.

c. Manufacturer’s CAGE and PIN.

3.8 Workmanship. The products shall be processed as to be uniform in quality and shall be free from loose or deposited foreign materials and other defects that will affect life, serviceability, or appearance. For information on workmanship, see 6.5

4. VERIFICATION

4.1 Classification of inspection. The inspection requirements specified herein are classified as follows:

a. First article inspection (see 4.2).

b. Conformance inspection (see 4.3).

4.2 Test conditions. Unless otherwise specified, the H-154A/AIC shall be tested under the following conditions:

Temperature:	Room ambient, (+ 15 degrees C to + 35 degrees C).
Pressure:	Normal atmosphere.
Humidity:	Prevailing ambient up to 90 percent relative humidity.

4.3 First article inspection. First article inspection shall be performed on the complete Electrical Headset H-154A/AIC, when first article sample is required (see 3.1). This inspection shall include the examinations and tests in table II.

4.3.1 First article sample size. A minimum of 10 headsets shall be subjected to the preproduction tests in the quantities indicated in table II. At least 3 headsets shall be subjected to each of the preproduction tests. More than one preproduction test may be performed on any one headset provided it has not been damaged by a previous test.

4.3.2 First article test report (see 6.6). Upon completion of the first article tests, three copies of a complete test report shall be furnished to the procuring activity. The report shall include the following:

a. The name and grade of all materials used in the headset.

b. The extent of compliance with each requirement in section **3.** This shall be done paragraph by paragraph with no omissions.

c. The actual dimensional measurements made, shall be shown in tabular form.

d. The contractor's intentions concerning each variation or deviation from the specification shall be included.

4.3.4 First article test program. Prior to any formal first article testing of the sample headsets, the manufacturer shall submit a draft of the proposed test program to the procuring activity for approval. The draft shall include:

a. List of all tests to be performed and complete procedures for each test, including block or schematic diagrams.

b. A list of test equipment to be used, identified by manufacturer and type number in the case of standard test equipment or identified by characteristics and parameters in the case of non-standard test equipment.

c. Copies of the data record forms to be used in recording the test data.

4.4 Conformance inspection. Conformance tests shall consist of:

a. Individual tests (see 4.4.1).

b. Sampling plan and tests (see 4.4.2).

4.4.1 Individual tests. Each headset shall be subjected to the individual tests listed in table II.

4.4.2 Sampling plan and tests. At least one headset shall be selected at random from every 100 headsets produced and be subjected to the environmental tests listed in table II.

4.4.2.1 Sampling plan. A sample of parts shall be randomly selected in accordance with table I, if one or more defects are found, the lot shall be re-screened and defects removed. After screening and removal of defects, a new sample of parts shall be randomly selected in accordance with table I, if one or more defects are found in the second sample, the lot shall be rejected and shall not be supplied to this specification.

TABLE I. Sampling plan.

Lot size	Sample size
2 to 8	1/
9 to 15	13 1/
16 to 150	13
151 to 280	20
281 to 500	29
501 to 1200	34
1201 to 3200	42

1/ Indicates entire lot must be inspected or sample size not to exceed lot size.

4.4.2.2 Rejection and retest. When one item selected from a production run fails to meet the specification, no item still on hand or later produced shall be accepted until the extent and cause of failure are determined.

4.4.2.3 Individual tests may continue. For operational reasons, individual tests may be continued pending the investigation of a sampling test failure. But final acceptance of items on hand or produced later shall not be made until it is determined that items meet all the requirements of the specification.

4.4.2.4 Sampling plan. Accept on zero, for general inspection as specified in table II.

4.5 Test schedule. The headsets shall be subjected to the tests listed in table II in the quantities shown. The order of performing the first article or acceptance tests is immaterial except that the salt fog test shall be last. At the end of each test, the headset shall be thoroughly inspected and checked for any damage, defects, or deterioration resulting from the tests.

TABLE II. First article and conformance.

Inspection or test	Requirement	Method	First Article	Individual	Sample
Examination of product		4.5.1	all	all	all
DC resistance of headset circuit	3.5.1.2	4.5.2	all	all	all
DC resistance of microphone circuit	3.5.1.3	4.5.3	all	all	all
Acoustic distortion	3.5.2.1	4.5.4	all		all
Functional operation	3.5.2.2	4.5.5	all	all	all
Temperature-altitude	3.6.1	4.6.1	all		all
Vibration	3.6.2	4.6.2	3		1%
Shock	3.6.3	4.6.3	3		1%
Humidity	3.6.4	4.6.4	3		10%
Salt fog	3.6.5	4.6.5	3		1%

4.5.1 Examination of product. The headset shall be inspected thoroughly to determine conformance to the requirements of this specification with respect to materials, mechanical detail, workmanship, physical dimensions, and finishes, prior to and during assembly. Particular attention shall be paid to neatness and thoroughness of soldering, wiring, marking of parts and assemblies, painting, and screw assemblies.

4.5.2 DC resistance of the headset circuit. The DC resistance of the headset circuit shall be measured across the earphone contacts of Telephone Plug U-174/U (see 3.5.1.2).

4.5.3 DC resistance of microphone circuit. The DC resistance of the microphone circuit shall be measured with the microphone contacts of telephone Plug U-174/U short circuited (see 3.5.1.3).

4.5.4 Acoustic distortion. Electrical voice signals shall be applied across the earphone contacts of Telephone Plug U-174/U. The input shall be such that the peak of the speech signal applied to the headset is at least 2.0 volts rms. During this test, the operator shall listen for buzzes, rattles, or voice distortion in the acoustic output of the headset (see 3.5.2.1).

4.5.5 Functional operation. A microphone, with impedance between 2.0 to 5.0 ohms, shall be connected to the microphone circuit of the headset, as shown on figure 2. Telephone Plug U-174/U on the headset shall be inserted in a Telephone Jack U-92A/U that has the earphone contacts connected to the output of an amplifier of suitable gain and the microphone contacts to the input of the same amplifier. During this test, the talker shall listen to his own voice while speaking into the microphone to insure that the headset is functioning satisfactorily.

4.6 Environmental testing.

4.6.1 Temperature. The headset or headset-microphone shall be tested in accordance with MIL-STD-810, method 501, procedure 1 with a storage temperature of -55 degrees C and an operating temperature of -40 degrees C and MIL-STD-810, method 502, procedure 1 with a storage temperature of 70 degrees C and an operating temperature of 65 degrees C. Upon completion, the test in 4.5.2 shall be performed (see 3.6.1).

4.6.2 Vibration. The headset or headset-microphone shall be tested in accordance with test MIL-STD-202, method 201. Upon completion, the test in 4.5.2 shall be performed (see 3.6.2).

4.6.3 Shock. The headset or headset-microphone shall be tested in accordance with test MIL-STD-202, method 213, test condition A. Upon completion, the test in 4.5.2 shall be performed (see 3.6.3).

4.6.4 Humidity. The headset or headset-microphone shall be tested in accordance with MIL-STD-202, method 103, test condition B. Upon completion, the test in 4.5.2 shall be performed (see 3.6.4).

4.6.5 Salt fog. The headset or headset-microphone shall be tested in accordance with test MIL-STD-202, method 101, Salt Atmosphere, test condition B. Upon completion, the test in 4.5.2 shall be performed (see 3.6.5).

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the Military Service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. Headset Electrical H-154A/AIC is intended for use with Flying Helmet, HGU-26/P. The headset includes a plug connector to plug in a low impedance dynamic microphone which is mounted in an oxygen mask. The headset is intended for use with Intercommunication Sets AN/AIC-10 and AN/AIC-18 to provide communication of high intelligibility under the extreme noise conditions encountered in military aircraft.

6.2 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number, and date of this specification.

b. Contract number.

c. When first article is required (see 3.1).

d. Packaging requirements (see 5.1).

6.3 Tin whisker growth (see 3.5.4). The use of (Tin/Lead) alloys with tin content greater than 97 percent, by mass, may exhibit tin whisker growth problems after manufacture. Tin whiskers may occur anytime from a day to years after manufacture and can develop under typical operating conditions, on products that use such materials. Conformal coatings applied over top of a whisker-prone surface will not prevent the formation of tin whiskers. Alloys of 3 percent lead, by mass, have shown to inhibit the growth of tin whiskers. For additional information on this matter, refer to ASTM B 545 (Standard Specification for Electrodeposited Coatings of Tin). Copies of this document are available from http://www.astm.org or ASTM International, P.O. Box C700, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

6.4 Environmentally preferable material. Environmentally preferable materials should be used to the maximum extent possible to meet the requirements of this specification. As of the dating of this document, the U.S. Environmental Protection Agency (EPA) is focusing efforts on reducing 31 priority chemicals. The list of chemicals and additional information is available on their website http://www.epa.gov/osw/hazard/wastemin/priority.htm. Included in the EPA list of 31 priority chemicals are cadmium, lead, and mercury. Use of these materials should be minimized or eliminated unless needed to meet the requirements specified herein (see 3.2).

6.5 Workmanship (see 3.8). For information on workmanship see MIL-HDBK-464, Guideline 9.

6.6 Test report (see 4.3.2). For information on preparation of a test report, see MIL-HDBK-831.

6.7 Subject term (key word) listing.

Cord
Cable
Earphone
Microphone
Plug
Tin
Whisker

6.8 Amendment notations. The margins of this specification are marked with vertical lines to indicate modifications generated by this amendment. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations.

CONCLUDING MATERIAL

Custodians:
Air Force - 85
DLA - CC

Preparing activity:
DLA - CC

(Project 5965-2015-003)

Review activity:
Air Force - 99

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